

8.3 Transpiration

Name: _____ Class: _____ Date: _____

Total: 22 marks

KEY WORDS transpiration 蒸腾作用 • humidity 湿度 • temperature 温度 • wind speed 风速
• stomata 气孔

Objective

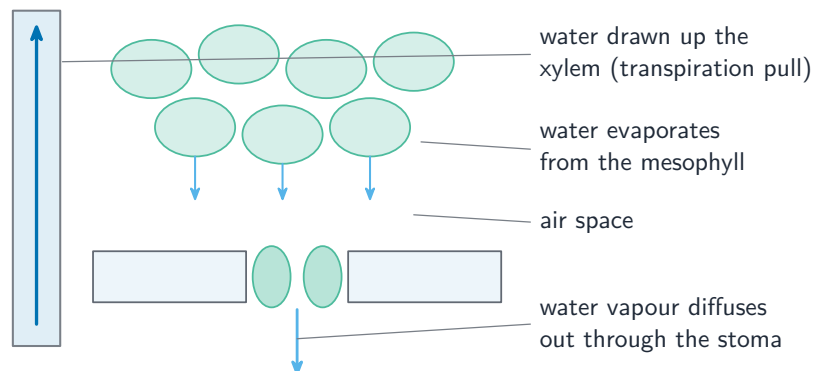
Build the skills to answer exam questions on **transpiration** 蒸腾作用 — what it is, the factors affecting its rate, and the **transpiration pull** 蒸腾拉力.

You must be able to:

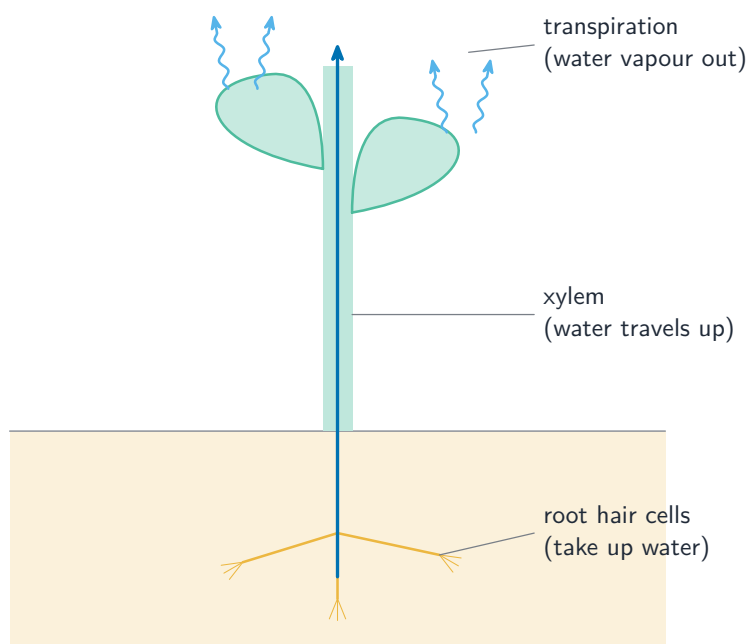
- describe transpiration (evaporation then diffusion out of the stomata)
- explain how temperature, wind and humidity affect the rate
- describe how the transpiration pull moves water up the xylem

1 Worked examples

■ Transpiration



Water evaporates from the wet mesophyll into the air spaces, then diffuses out of the stomata



Transpiration pulls water up the xylem pathway

- **faster when:** hotter (more evaporation), windier (vapour carried away), drier air.
- **transpiration pull:** water leaving the leaf pulls a column of water up the xylem.

2 Practice

2.1 Define transpiration. [1]

2.2 State the effect of higher wind speed on transpiration rate. [1]

3 Exam-style questions

3.1 Transpiration is fastest in conditions that are: [1]

A	B
C	D

A cold, still and humid

B hot, windy and dry

C cold and dark

D warm and very humid

3.2 Water vapour is lost from the leaves.

(a) Describe the two steps by which water leaves the leaf. [2]

(b) Explain why a higher temperature increases the rate of transpiration. [2]

3.3 Explain how the transpiration pull moves water up the xylem. [2]

3.4 A student measured the mass lost by a leafy shoot in four conditions, each for one hour.

Condition	Mass lost / g
A still air, 20 °C	1.2
B moving air (fan), 20 °C	2.8
C still air, 30 °C	2.1
D still air, 20 °C, in a plastic bag	0.3

(a) Explain the result for each of **B**, **C** and **D** compared with **A**. [6]

(b) State why measuring mass loss is a fair way to measure the rate of transpiration. [2]

(c) Describe how water moves from the soil, through the plant, to the air. [3]

(d) State **two** variables the student had to keep the same for the comparison to be fair. [2]
